Article **Journal of Innovative Engineering**
December 2022, Vol.6 No.19 6-12

Design needs and creativity: strategic transitions towards innovation

Necesidades de diseño y creatividad: transiciones estratégicas hacia la innovación

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DOI: 10.35429/JOIE.2022.19.6.6.12 Received July 30, 2022; Accepted December 30, 2022

Abstract

Today identifying the user's need to design a product is somewhat confusing, on one hand, it is because some designers in Mexico do not carry out the design process based on the end user, on the other hand, terms with different meanings are generally used to refer to the needs, moreover, it is difficult to establish them and the result is perceived as conventional by those who will actually use the product. This article presents a proposal to design products that generate value for the end user based on the identification of their needs, through an organized process and with clear elements that facilitate the development of innovative proposals aimed at them. For this purpose, a documentary methodology was followed, the information collected was analyzed, the relationships between the concepts were established and the phases were identified, which we refer to as innovation transitions, in which the product can be innovated. We assume that, if a clear identification of the user's needs is made, the designer will be able to define the requirements to satisfy them in a disruptive way, as well as establish the design requirements and specify the attributes of the product, consequently, generate proposals mostly innovative.

Design needs, Needs identification, Innovation transitions

Resumen

Actualmente identificar la necesidad del usuario para diseñar un producto es algo confuso, por un lado, se debe a que algunos diseñadores en México no realizan el proceso proyectual con base en el usuario final, por el otro lado, generalmente se utilizan términos con significados diferentes para referirse a las necesidades, en consecuencia, es complicado establecerlas y el resultado es percibido como convencional por quien realmente utilizará el producto. Este artículo presenta una propuesta para diseñar productos que generen valor para el usuario final a partir de la identificación de sus necesidades, mediante un proceso organizado y con elementos claros que faciliten el desarrollo de propuestas innovadoras orientadas a él. Para este fin, se siguió una metodología documental, se analizó la información recopilada, se establecieron las relaciones entre los conceptos y se identificaron las fases, a las que nos referimos como transiciones de innovación, en las que se puede innovar el producto. Suponemos, que, si se hace una clara identificación de las necesidades del usuario, el diseñador será capaz de definir los requisitos para satisfacerlas de forma disruptiva, así como, establecer los requerimientos de diseño y especificar los atributos del producto, por consiguiente, generar propuestas mayormente innovadoras.

Necesidades de diseño, Identificación de necesidades, Transiciones de Innovación

Citation: MARTÍNEZ-ESPÍNOLA, Edgar Eliezer, BALDERRAMA-ARMENDÁRIZ, César Omar, ARIZA-AMPUDIA, Silvia Verónica and MORENO-TOLEDANO, Leonardo Andrés. Design needs and creativity: strategic transitions towards innovation. Journal of Innovative Engineering. 2022. 6-19:6-12.

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Introduction

It is clear the value that needs have for design, (Lecuona, Fernández, López, & Fernández, 2010; Baca & Roig, 2013), as well as the importance of the designer being able to identify those that are effective for the user (Asimow, 1962, p. 50), carrying out this process will result in increasing the chances of success of the project, since it will allow the development of a competitive product (Rodríguez, 2004). But, usually, the design process of some designers in Mexico does not start based on the user's needs, but from the definition of requirements, which, in this research, are understood as the way in which the solution is materialized to satisfy the needs. Consequently, by not establishing the needs adequately or by being ignored, the direction of the process will deviate from the objective, as well as the result and it is very likely that the design will fail (Seva, Duh, & Helander, 2007), therefore it is suggested to rely on different methods that will help to monitor the process, achieve compliance with objectives and document the actions in order to facilitate decision making (Ulrich & Eppinger, 2013).

In addition, the client is the one who will dictate the specifications of the project, so it is common to consider it as if it were the user, but, it should be clarified that those involved in the design project, the company, the client, the product, the user or the designer, each have their own needs (Lu, Feng, Zheng, & Tan, 2016). Therefore, it is paramount to know what needs the design will satisfy, otherwise, presumably, the result will not satisfy the user because the product was designed based on the customer.

Thus, identifying the user's needs in the design process is complex, "it is one of the most difficult parts of design" (Norman, 2013, p. 09), because, generally, the user does not know what his real need is. Then, designers got used to design what they are asked to design, which will not be precisely the most adequate because it will not satisfy the need, this lack of success will not be because of technical failures or a bad performance, but because the real needs of the users were not defined (Kirberg, 2005).

The origin of this situation is that this way of working leads to an automatic solution, i.e., the commonly used way to solve the problem is resorted to, which, probably, will result in something little or nothing innovative for the user, because no analysis of the problem was made, no reflection was made on what is really behind the user's or customer's request, i.e., the need that should be satisfied was not sought. For this reason, it is suggested that designers use methodological tools to design, so that it is easier for them to manage and organize all the information required during the process (Simón, 2009, p. 94).

To conclude, the objective of this article is to investigate through an analysis how to design innovative products from the process of identification of user needs, with the assumption that if a clear identification of user needs is made in the process of satisfying the need, by establishing the requirements, design requirements and product attributes, the designer will be able to generate more innovative proposals.

Theorists and design needs

To define need Vilchis (2014), starts from the Latin necesitatis, whose meaning is "necessarium constitutive quality that derives from necesse -that which does not cease, that which does not cease to be-". He mentions that "to understand a design need and its value, it is indispensable to take into account the contextual characteristics that affect the given object" (p. 51), he adds that needs are established by culture and civilization, so the value given to them, as well as their function, will depend on the context in which they arise. "The need is the result of some deficiency that when satisfied produces gratifying sensations, enjoyment, pleasure, well-being, relaxation, etcetera. Design satisfies needs that it concretizes through the use of objects and the configuration of meanings" (p.52), then, what is really of interest for design is the demand for a material or formal satisfaction.

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The first stage of the methodology proposed by Morris Asimow (1962, p. 12) is the Feasibility Study that seeks to reach different solutions that will be useful for the design problem, the first step of this phase is to demonstrate if the original need, which was presumed to be valid, really exists and is valid or at least there is strong evidence that at least it exists latently. This original need is the starting point for this design process.

In the Diana Model developed by Oscar Olea and Carlos González Lobo, the designer must be able to discern five levels of response that characterize the specific field of design, two of which are related to the need. The first is the Functional, which corresponds to the relationship between the need and the form-function that satisfies it through use and the second is the Structural, which refers to the rigidity or durability of the object as a function of use, it relates the validity of the need with the permanence of the object in good condition (apud Vilchis 2014 p. 128).

For Gui Bonsiepe (1978) the project methodology begins with the structuring of the problem, where a situation that does not fit in the environment is sought and expressed in the form of an unsatisfied need, which will be evaluated "according to its compatibility with other needs, its priority with respect to other needs and according to the availability of resources (...) to establish whether the general formulation of a problem is at least justified" (p. 151).

In Bernd Löbach's method (1981, p. 140), phase one is the analysis of the problem, where the need is analyzed in order to establish "how many people would be interested in the solution of the problem in the form of an industrial product", which will allow companies to know the feasibility of developing the product and its success in the market.

Gillam Scott (1982) points out that "design is any creative action that fulfills its purpose (...) and creation satisfies human needs" (p. 1).

The research phase in Hans Gugelot's Methodology for the ULM School of Design, is where "you should find out as much as you can about the users (...) try to find the context in which the product will be used, and at the same time study its function and possible methods of production" (apud Simón 2009, p. 122).

Norman (2013, p. 20) establishes user-centered design as a philosophy based on the needs of users, with the goal of designing more usable products.

Victor Papanek (2014) points out that the function of design is "the way in which it fulfills its purpose" (p. 30) and proposes a diagram in which he shows the actions involved in what he calls "the functional complex" (p. 31) and the relationships between them. For Papanek, the real needs are economic, psychological, spiritual, technological and intellectual, on which design should focus, and he considers that they are regularly "more difficult and less profitable to satisfy than the carefully crafted and manipulated 'needs' that fashion and novelty inculcate" (p. 36).

Morris (2009) points out that a market-based design approach focuses on understanding what the main needs (or increasingly desires) of people are, "so that new or better products can be defined and created" (p.32).

It is necessary to work together with the user to identify their needs, therefore, to understand them, in order to develop design proposals that meet them; once these proposals are made, it is necessary to return to the original needs of the user and evaluate the design proposal from the user's point of view (Maldonado, Balderrama, Pedrozo, & García, 2019, p. 58), likewise, the authors highlight the importance of the user as a fundamental element to define the quality of a product, and on the other hand, they point out as the main factor in the failure of products, the fact that they were designed without considering the user's needs.

As we can see, there is a convergence in the importance of identifying the needs to design, as well as the benefit of doing it properly to achieve the correct development of the project and the importance of doing it from the initial phases.

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To conclude, based on what has been stated in this section regarding the need, its definition and difference with respect to other concepts, as well as its importance for the design process, user needs will be considered in the following way in this research:

> - The user's need for the design is when a problematic of the person who will give use to a product is manifested with respect to a specific personal area and of its environment, which, the design must recognize and help to be satisfied -.

Study procedure

A documentary strategy was followed to gather information from the sources, analyze them and search for their relationships in order to organize the data collected for a reliable understanding of the subject. The search was carried out with the support of the Science Direct and Pro Quest databases, as well as the Google Scholar search engine, using the concepts 'needs', 'user needs' and 'design process'.

	Subject	Keywords	Combination		
t1	Definition of design process, method, methodology and technique	▪ Design Process ▪ Design Methodology ▪ Design Method ▪ Design Technique	————		
t2	Importance and advantages of requirements for design Consequences of omitting them	▪ Needs ▪ User Needs ▪ Design	Needs User Needs	+	Design
t3	Requirements as part of design processes, methodologies and methods	▪ Needs ▪ Design Process ▪ Design Methodology ▪ Design Method ▪ Design Technique	Needs	+	- Design Process - Design Methodology - Design Method - Design Technique
t4	Proposal of proprietary methods for needs identification	▪ Needs ▪ User Needs ▪ Design ▪ Design Method ▪ Design Technique	Needs	+	- Design Method - Design Method - Design Technique
			Needs User Needs	+	- Design Method - Design Method - Design Technique

Table 1 Search organization by subject
Source: Own elaboration

Table 1 shows the organization of the search organized by topics, for each of which key words were defined and, in some cases, combined to delimit the results. Afterwards, an elementary definition of the terms was sought, in order to subsequently look for how the need is defined from the design point of view.

The review made it possible to establish the differences and relationships between the concepts, which were organized to establish a process for satisfying the need. Based on the proposal of a diagram, the transitions where the greatest opportunity for innovation in the development of a product is produced were located.

Finally, a description of the transitions was made exemplifying their application and their moment of opportunity to generate products or elements of a product that contribute in the form of innovation.

Development

Once the documents were selected, firstly, the terms used to refer to needs were investigated. Table 2 shows these terms and the area of design where they are used, as well as the use of the term. The need is something that is impossible to avoid, lack or resist. A requirement is a necessary situation or condition for something.

On the other hand, a requirement is a request for a thing that is considered necessary.

Finally, the attribute is each of the qualities or properties of a being.

It has been considered to define these terms in order to establish their difference, since they are generally used indistinctly by some authors in the field of design to refer to requirements, as if they were synonyms, but they are not.

AREA	TERM	REFERENCE
Axiomatic Design	Attribute Requirement	Suh, 2001, p. 10
Industrial Design	Requirement	Rodríguez, 2000, p. 52
Quality Function Deployment (QFD) Methodology	Attribute Requirement What's	Yang & El-Haik, 2016, p. 179
Kano Model	Need Attribute Requirement	Brue, 2003, p. 127 Yang & El-Haik, 2016, p. 184

Table 2 Terms used to refer to needs in design
Source: Own elaboration

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In addition to the fact that the concepts need, requirement, requirement and attribute are different, their place and time in the design process are also different, i.e., arranged in a linear way, as they are presented in the design process, we can observe that one follows the other, as in a process, consequently, they cannot occur in a synchronous way (See Figure 1).

As a consequence, they cannot occur in a synchronous manner (See Figure 1). Therefore, first the need must be known, which will allow the requirement to be defined, and this will give way to the establishment of the requirement, or requirements, ending with the generation of the attribute, as if they were prerequisites.

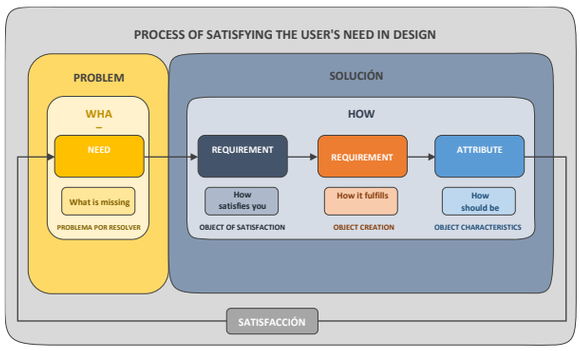

Figure 1 Process of satisfying user needs in design
Source: Own elaboration

To illustrate the above approach, the following examples are presented in Table 3. It is worth mentioning that only one requirement was considered in the responses to the needs as a measure of understanding of the approach, but it is known that a single need usually produces a series of requirements.

In these examples we can perceive the difference between the concepts, as well as the way in which each one fulfills its function in the process of satisfying the need. These examples show the conventional way or the way that is regularly used to satisfy the need, but it is here where you can take the step and generate an innovative proposal. By this, we mean that in the process of defining the requirement (Innovation Transition 1), which is the first step to start materializing the solution to the problem. By identifying the need, during a creative process, the designer is able to go beyond the conventional and devise an innovative way to solve the need to remain seated, by change the conventional response to the requirement, a chair, for a support suspended in the air by magnetism, for example.

DESIGN OF A DWELLING HOUSE				
NEED	REQUIREMENT	REQUIREMENT		ATTRIBUTE
Have a place in which to shelter and protect themselves from external agents such as the weather, wildlife, other people, etc.	Safe house	Resistant and safe materials		- Brick walls with concrete grating - Entrance grills, windows and metal doors
DESIGN OF A WORK CHAIR				
NEED	REQUIREMENT	REQUIREMENT		ATTRIBUTE
Working while sitting for prolonged periods of time	Comfortable chair	Ergonomics	Dimensions	- 17" x 25" backrest - Polyurethane
			Back morphology	- Flexible backrest - Polyurethane
			Support the weight	- Seat 20" x 20"
CELL PHONE DESIGN				
NEED	REQUIREMENT	REQUIREMENT		ATTRIBUTE
Immediate communication via phone call, text message and social networks	Smartphone	Of dimensions and weight that allow it to be carried and handled with ease		·Dimensions - 7" x 3" - Weight - 120 to 200 gr
		System capacity		- Operating system Android 11.0.0.0
		Storage capacity		- Storage capacity

Table 3 Exemplifications of the information flow exercise
Source: Own elaboration

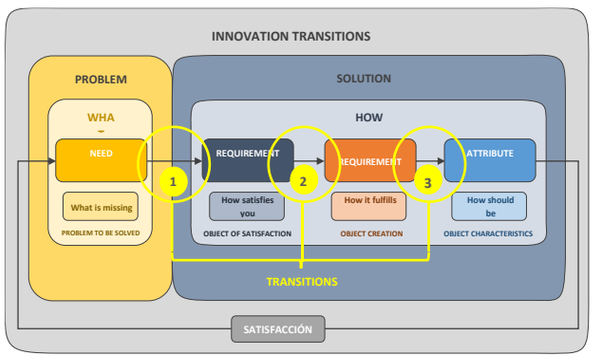

Figure 2 Transitions between stages of the need satisfaction process
Source: Own elaboration

In the step from the requirement to the requirement (Innovation Transition 2), there is another cycle of creativity where it is also possible to generate an innovation that meets the requirement, such as the process of creating this suspension support by magnetism, continuing with this example, or the mechanisms and technology necessary to achieve its operation. Then there is the step from requirements to product attributes (Innovation Transition 3), where it will be possible to innovate with the use of certain elements: materials, shapes, colors, joints, etc., not previously used. Figure 2 shows the transitions described here.

ISSN 2523-6873

If we pay due attention to each of the transitions, then we have the possibility of breaking paradigms by responding from the design, as a way to satisfy real user needs posed through a problem. Then we can have as a result innovative elements within our product or a whole innovative product. It is important to clarify that the innovation will be under the user's perception, if all these proposals are focused on the detected need of the user, they have high probabilities of satisfying it, in addition, if they do it in an unconventional way and contribute value to the user, this will appreciate the innovation in the result.

Conclusions

It is already clear that the needs are an important part of the design process and that identifying them will be essential for the optimal development of this with results aimed at satisfying them, but, also now, we can highlight the importance of carrying out the process of identifying needs in an organized manner and being clear about the difference between the actors involved, that is, the difference between user and customer, to ensure that the needs with which it will be designed are those of the person who will use the resulting product. Also, understanding the stages of the process of identifying needs and what is established in each of them, to focus efforts correctly and ensuring that each stage goes according to the satisfaction of the need. Finally, we emphasize the importance of designing with the support of this process, because as shown, something as simple as ordering the elements of the process and clarifying the definition of each of them, can provide a better understanding of what is being done with the opportunity to generate innovative proposals, in some aspect of the product to be designed or in an integral way in the final product.

Acknowledgments

We thank the Consejo Nacional de Ciencia y Tecnología (CONACYT).

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ISSN 2523-6873